

REMARKS/ARGUMENTS

In the outstanding Office Action, the Examiner rejected claim 56 on formal grounds, correctly observing that claim 56 contains a typographical error. By way of this amendment, that typographic error has been corrected and therefore the rejection has been overcome.

In the outstanding Office Action, the Examiner also rejected claims 54-59 as unpatentable over the Dubin patent or the Poris patent in view of the Lowenheim text and the Ameen patent. As the Examiner is aware, claim 54 of the present application has been copied verbatim from U.S. Patent No. 6,074,544 by way of an earlier amendment in this application, and has been presented along with a request that the PTO declare an interference between the present application and the '544 patent. When the present Office Action was received rejecting claim 54 over the prior art, Semitool, the assignee of the present application, filed a Request for Reexamination of the '544 patent, relying on the same prior art which the Examiner had cited in the Office Action of April 4, 2003 in this application. That Request for Reexamination was given No. 90/006,689. On September 15, 2003, the Examiner granted the Request for Reexamination, concluding that the prior art raised a substantial new issue of patentability.

The Examiner will note that Semitool, when it presented its Request for Reexamination of the '544 patent, indicated that it believes that the claims of this application and the Novellus '544 patent are patentable over the prior art cited in Semitool's request. Semitool does not believe that

the prior art cited by the Examiner in this application (and in the Request for Reexamination) fairly renders obvious the subject matter of the claims.

On further review, Semitool adheres to that position. Therefore, Semitool respectfully traverses the rejections of claims 54-59. The Dubin patent, as the Examiner observes, describes what is, in effect, a conventional copper electrolytic plating process used in the manufacture of semiconductor devices. There is no suggestion in the Dubin patent that the electrolytic deposition process should be carried out in two stages, one with a low current density to initiate the plating operation and the second with a higher current density to completely fill trenches and holes on the surface of the wafer. The Poris patent is essentially the same. Like Dubin, Poris fails to teach, as the Examiner recognizes, the step of increasing the current flow to increase the current density.

The Examiner relies on the secondary references, namely the Lowenheim text and the Ameen patent for teaching of the concept of low current density initiation followed by higher current density for the bulk plating. The Lowenheim text is a general textbook, and is concerned with such plating operations as depositing an electrically conductive film onto a nonconductive surface such as plastic as the Examiner observes on page 5 of his Office Action. The Ameen patent is similar, teaching a method for metallizing polymeric films by electrodeposition.

As the Examiner must surely appreciate, there is no suggestion in the art to combine the teachings of the secondary references with those of

the primary references as the law of obviousness has demanded. Quite the contrary, techniques employed in the electroplating of plastics represent an entirely different line of endeavor as compared to depositing copper films on semiconductor wafers. There is simply no similarity in the substrates or the respective problems that those substrates raise to those skilled in the art. No one skilled in the art would be led by the teachings of either the Lowenheim text or the Ameen patent to modify the methods disclosed by either Dubin or Poris in electroplating semiconductor wafers. In sum, the secondary references to Lowenheim and Ameen are simply not relevant to Dubin and Poris, and therefore the Examiner's rejection as set forth in this application represent a hindsight reconstruction of the subject matter claimed in this application.

Furthermore, the independent claims 54, 57, 58 and 59 all define conditions after which a higher current density is applied. Claim 54 and 58 define that condition as "after a combined thickness of the seed and plated layers has reached a predetermined value" and claims 57 and 59 define that condition as "after a predetermined time". None of the references disclose or suggest any such conditions for when the higher current density is applied.

In respect of claims 32-53, which the Office Action does not address:

a) the second current density is specified as being "substantially greater" than the first current density, and applied for a second

period of time so as to effect a "majority of the metal deposited onto the surface of the workpiece" (independent claims 32, 44, 50, 52 and 53);

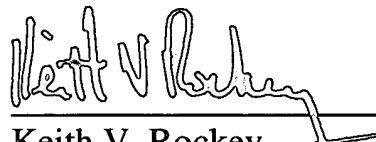
b) the second current density is specified as being "substantially greater" than the first current density (independent claims 45, 58 and 51);

c) the second current density is applied to "at least partially fill the recessed microstructures" (independent claim 46).

None of the references disclose or suggest any such conditions.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw his rejection in this application, allow claims 32-59 and declare the interference.

Respectfully submitted,




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